

CLAIMS

1. A magnet assembly comprising first and second sets of coils for generating respective magnetic fields, wherein
5 the coils are constructed and arranged such that under working conditions, a first homogeneous region can be generated within the envelope defined by the magnet assembly and a second homogeneous region can be generated outside the envelope, the resultant magnetic field in each
10 region being sufficiently homogeneous to enable a NMR process to be performed on an object in the region.
2. An assembly according to claim 1, wherein the coils are operable to generate the first and second homogeneous regions simultaneously.
- 15 3. An assembly according to claim 1 or claim 2, wherein the first set of coils define a solenoid.
4. An assembly according to any of the preceding claims, wherein the first set of coils are actively shielded.
5. An assembly according to any of the preceding claims,
20 wherein the second set of coils are nested.
6. An assembly according to claim 5, wherein the nested coils are substantially coplanar.
7. An assembly according to claim 5 or claim 6, wherein at least two of the coils of the second set are arranged to
25 carry working currents in opposite senses.
8. An assembly according to any of claims 5 to 7, wherein the second set of coils comprises at least two pairs of coils.
9. An assembly according to claim 8, when dependent on
30 claim 2, wherein in the first homogeneous region each pair of coils generates a substantially zero first order magnetic field gradient and substantially equal second order magnetic field gradients of opposite senses.
10. An assembly according to any of the preceding claims,
35 wherein the first set of coils is superconductive.
11. An assembly according to any of the preceding claims, wherein the second set of coils is superconductive.

12. An assembly according to claim 11, wherein the second set of coils are made from high temperature superconductor.
13. An assembly according to claim 11 or claim 12, wherein the second set of coils are located within a cryostat.
- 5 14. An assembly according to claim 13, when dependent on claim 10, wherein the first and second sets of coils are located within the same cryostat.
- 15 15. An assembly according to any of claims 1 to 13, wherein the second set of coils are self-contained so that they can be separated from the first set of coils without compromising the operational integrity of the first set of coils.
- 16 16. An assembly according to any of the preceding claims, wherein the second homogeneous region is substantially spherical.
- 17 17. An assembly according to any of claims 1 to 15, wherein the second homogeneous region is substantially disk shaped and has a magnetic field gradient in the axial direction.
- 20 18. An assembly according to any of the preceding claims, wherein the first homogeneous region is located within the first set of coils.
- 25 19. An assembly according to any of the preceding claims, wherein the magnetic field strength of each homogeneous region varies by no more than 100ppm.
20. An assembly according to any of the preceding claims, further comprising a power supply coupled to the coils so as continuously to energise the coils.
- 30 21. An assembly according to any of the preceding claims, further comprising an additional set of second coils located adjacent an opposite side of the first set of coils to the one set of second coils.